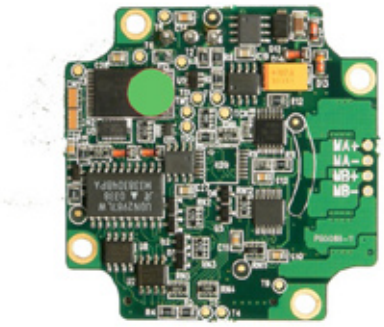
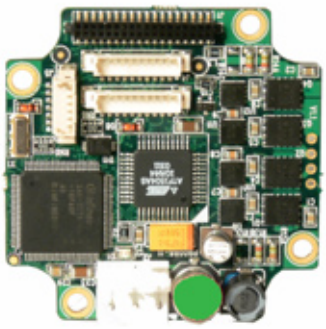
Step motor controller SMC75





The compact step motor controller SMC75 is designed for positioning and speed control of stepper motors.

The SMC75 can be delivered in a PCB version and in a housing with the PCB built-in and 2 to 4 pcs. M12 connectors.

All kinds of 2-phase, 0 to 3A, stepper motors can be connected.

SMC 75 is a well-proven controller used for many years in the popular QuickStep integrated stepper motors.

Basic features of the controller are:

- Serial RS485 interface for setup and programming
- Position controller with grafic programming, Canbus, CANopen 402 or DeviceNet
- Option for SSI absolute multiturn encoder
- Option for semi-absolute multiturn encoder
- A double supply facility is available so that position and parameters are maintained at emergency stop
- Gear mode
- µPLC built-in with grafical programming.
- MACmotor protocol so MACmotor, Quickstep motors and SMC75 can be connected on the same RS485 bus
- Command for easy PLC/PC setup and communication
- Power supply 12-48VDC
- Fixed 1600 pulses/rev.

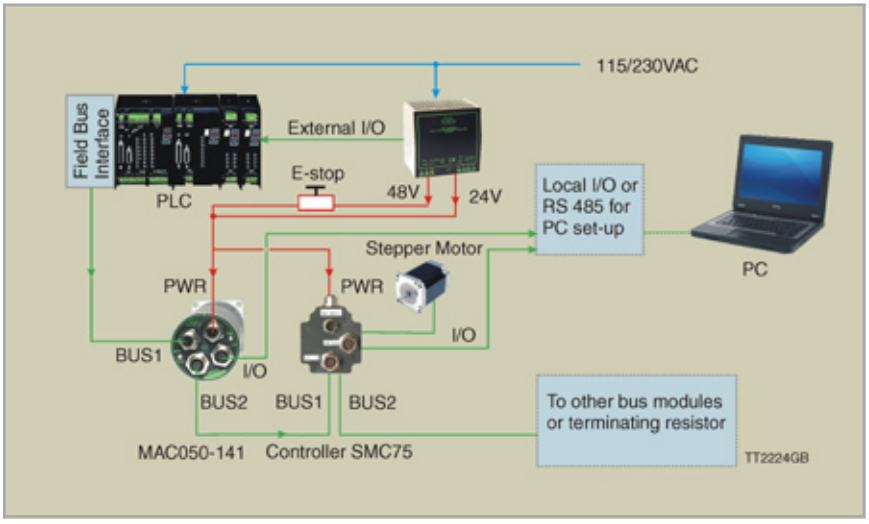
Built-in µprocessor with 8 In/Out that can be configured as inputs, PNP outputs or analogue inputs. Driver technology is improved as compared to SMD73 and supply voltage is 12-48VDC.

Interface possibilities to the SMC75 controller:

- From PC/PLC with serial commands via 5V serial and RS485.
- Pulse/direction input. Encoder output.
- CANopen, DeviceNet
- 8 I/O, 5-28VDC that can be configured to Inputs, Outputs or analogue inputs
- Future option for Profibus DP, Ethernet, Bluetooth and Zigbee wireless

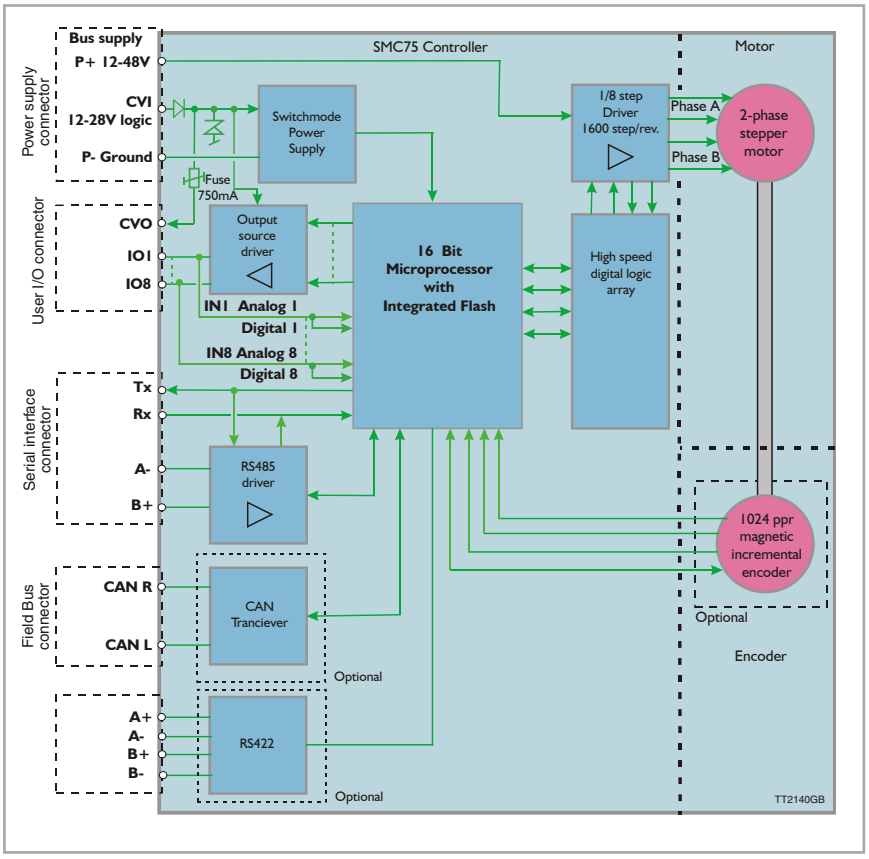
SMC75 mounted in housing with M12 connectors

Motors in a network



Controller SMC75 and MAC motor in an RS485 or CANbus network

Block Diagram



Accessories

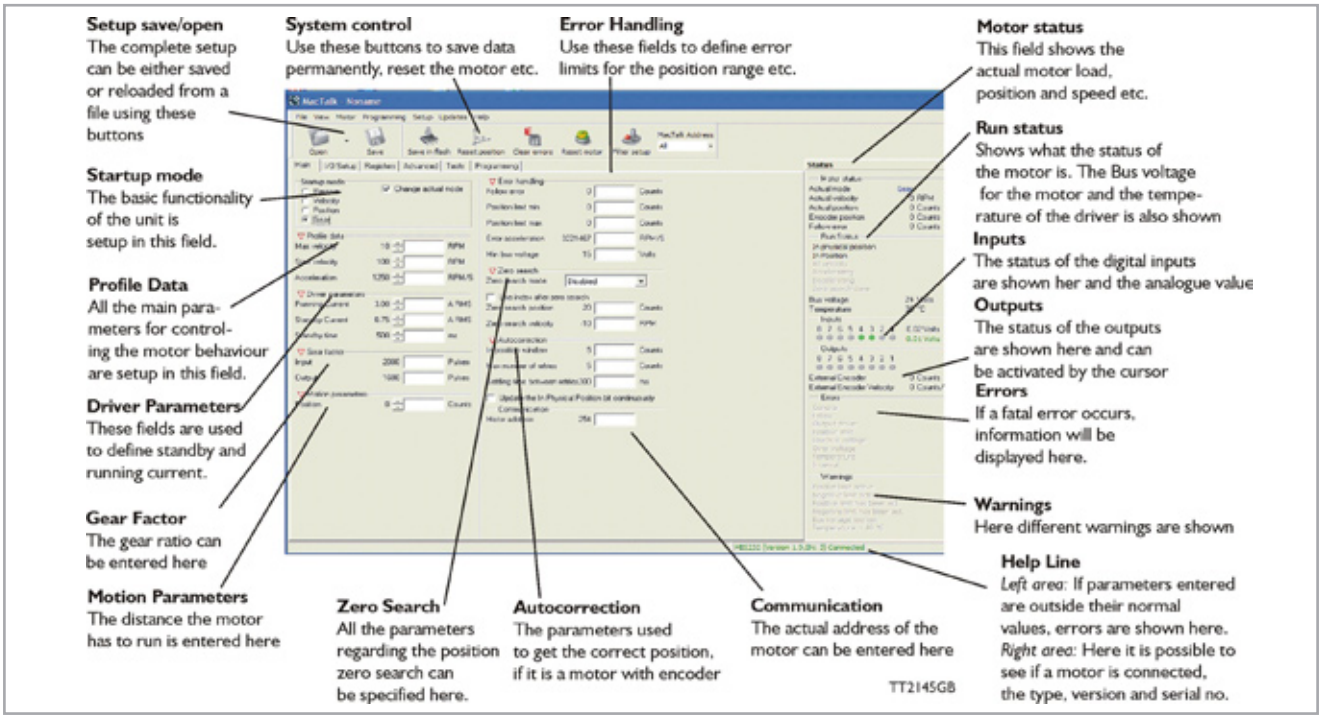
RS485-M12-1-5 cable for M12, 5pin to RS485 USB. 5m	
RS485-USB-ATC-820 USB to RS485 adaptor. 0.5m	
WI1000-M12xxVxxN M12, angled female/ male cable can be delivered. See cable datasheet for details.	
WI1000-M12xxTxxN M12, straight female/ male cable can be delivered. See cable datasheet for details.	
PSU24-075 PSU 24VDC/3.2A, 75W. 85-264VAC DIN Switch-mode power supply. UL/CE approved. DIN rail. HxDxW = 126x100x56mm.	
PSU48-240. PSU48VDC/5A. 240W. 100-240 VACSwitch-mode power supply. UL/CE approved. DIN rail. HxDxW = 126x100x126mm.	
MacTalk Windows software for setup and programming	
MacRegio Windows software for protocol analyses and understanding.	
MACCOMM OCX/active x driver for Windows programs	

Specifications

	Min.	Max.	Absolute Max.	Unit
P+	12	48	-	VDC
CVI	12	28	32	VDC
CVI no output activated	95 @24VDC			mA
Motor Current	0	3	3	A RMS
Input Logic Low	-0.5	0.9		VDC
Input Logic High	1.9	28	32	VDC
Output Logic High	12	28	32	VDC
Analogue Input	0	5	32	VDC
Output Current			350*	mA

*Totally max. 800 mA for all 8 outputs active.

Setup and programming with software MacTalk



MacTalk introduction

The MacTalk software is the main interface for setting up the stepper motor controller for a specific application.

The program offers the following features:

- Choice of the operating mode of the stepper motor controller.
- Changing main parameters such as speed, motor current, zero search type, etc.
- Monitoring the actual motor parameters in real time, such as supply voltage, input status, etc.
- Changing protection limits such as position limits.
- Saving all current parameters to disc.
- Restoring all parameters from disc.
- Saving all parameters permanently in the motor.
- Updating the motor firmware or MacTalk software from the internet or a file.

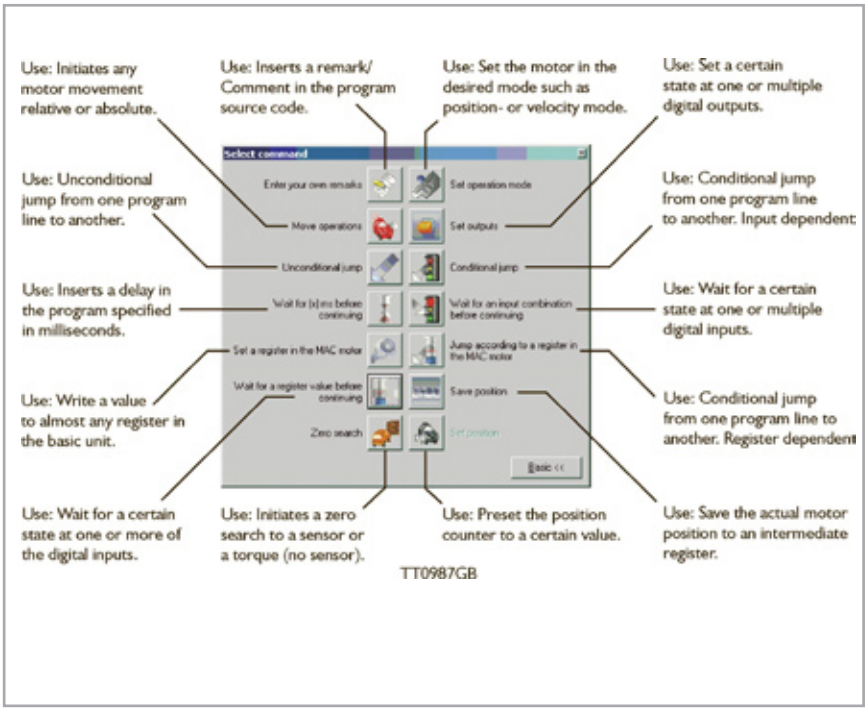
The main window of the program changes according to the selected mode, thus only showing the relevant parameters for operation in the selected mode.

Command toolbox description

The toolbox used for the programming covers 14 different command types. The idea for the commands - is to have an easy access to the most common functions in the motor. Some functions seems to be missing by the first sight but the botton "Set register in the SMC75 Controller" or "Wait for a register value before continueing" gives direct access to +50 registers down in the SMC75 Controller such as the gear ratio or the actual position register.

In total this gives a very power full programming tool since >95% of a typical program can be build using the simple command icons and the last part is optained by accessing the basic motor registers directly.

Below is a short description of all 14 command icons.

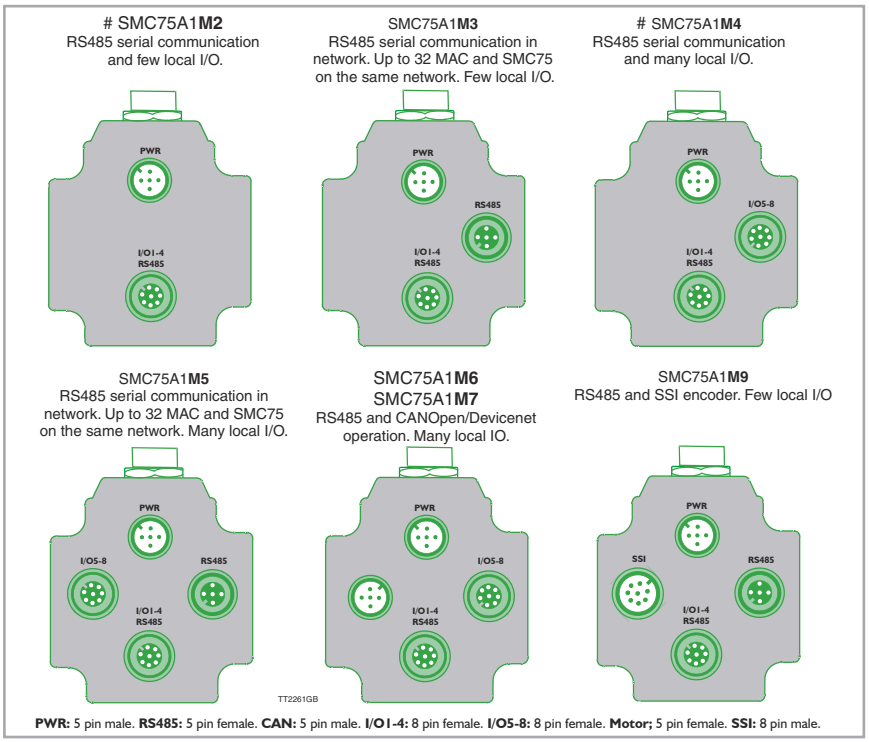


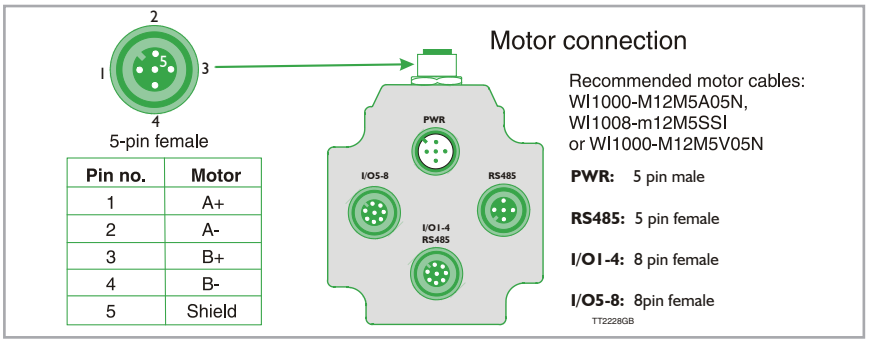
Connections, housing version

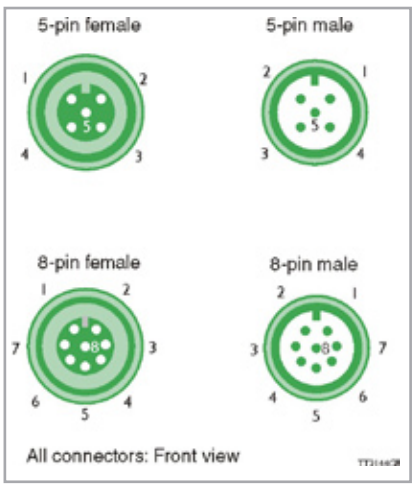
Versions with positioning and speed control:

QUICKSTEP M12 connector overview	Power Male 5pin	IO1-4/RS485 Female 8pin	IO5-8 Female 8pin	RS485 Female 5pin	CANOpen/DeviceNet Male 5pin	SSI Encoder Male 8pin	Function
#SMC75A1M2	X		X				RS485, 4IO
SMC75A1M3	X		X	X			2xRS485, 4IO
#SMC75A1M4	X	X	X				RS485, 8IO
SMC75A1M5	X	X	X	X			2xRS485, 8IO
SMC75A1M6	X	X	X		X		CANOpen, RS485 8IO
#SMC75A1M7	X	X	X		X		Devicenet, RS485 8IO
SMC75A1M9	X	X		X		X	SSI, 6IO
M12 Pin 1	P+ (12-48VDC)	IO1	IO5	B+ (RS485)	CAN_SHLD	IO5 Zero Setting	
M12 Pin 2	P+ (12-48VDC)	IO2	IO6	A- (RS485)	CAN_V+	IO6 Counting Direction	
M12 Pin 3	P- (GND)	IO3	IO7	B+ (RS485)	CAN_GND	A+ (Clock+)	
M12 Pin 4	CVI (12-28VDC)	GND IO-	GND IO-	A- (RS485)	CAN_H	GND	
M12 Pin 5	P- (GND)	B+ (RS485)		GND	CAN_L	B- (Data in-)	
M12 Pin 6	-	A- (RS485)		-	-	B+ (Data in+)	
M12 Pin 7	-	IO4	IO8	-	-	A- (Clock-)	
M12 Pin 8	-	CVO (Out)	CVO (Out)	-	-	CVO+ (Out)	
M12 connector solder terminals	WI1008-M12F5SS1	WI1008-M12M8SS1	WI1008-M12M8SS1	WI1008-M12M5SS1	WI1008-M12F5SS1	WI1008-M12M8SSI	
M12 cables 5m.	WI1000-M12F5T05N	WI1000-M12M8T05N	WI1000-M12M8T05N	WI1000-M12M5T05N	WI1006-M12F5S05R	WI1000-M12M8T05N	

: Only > 50 pcs order .



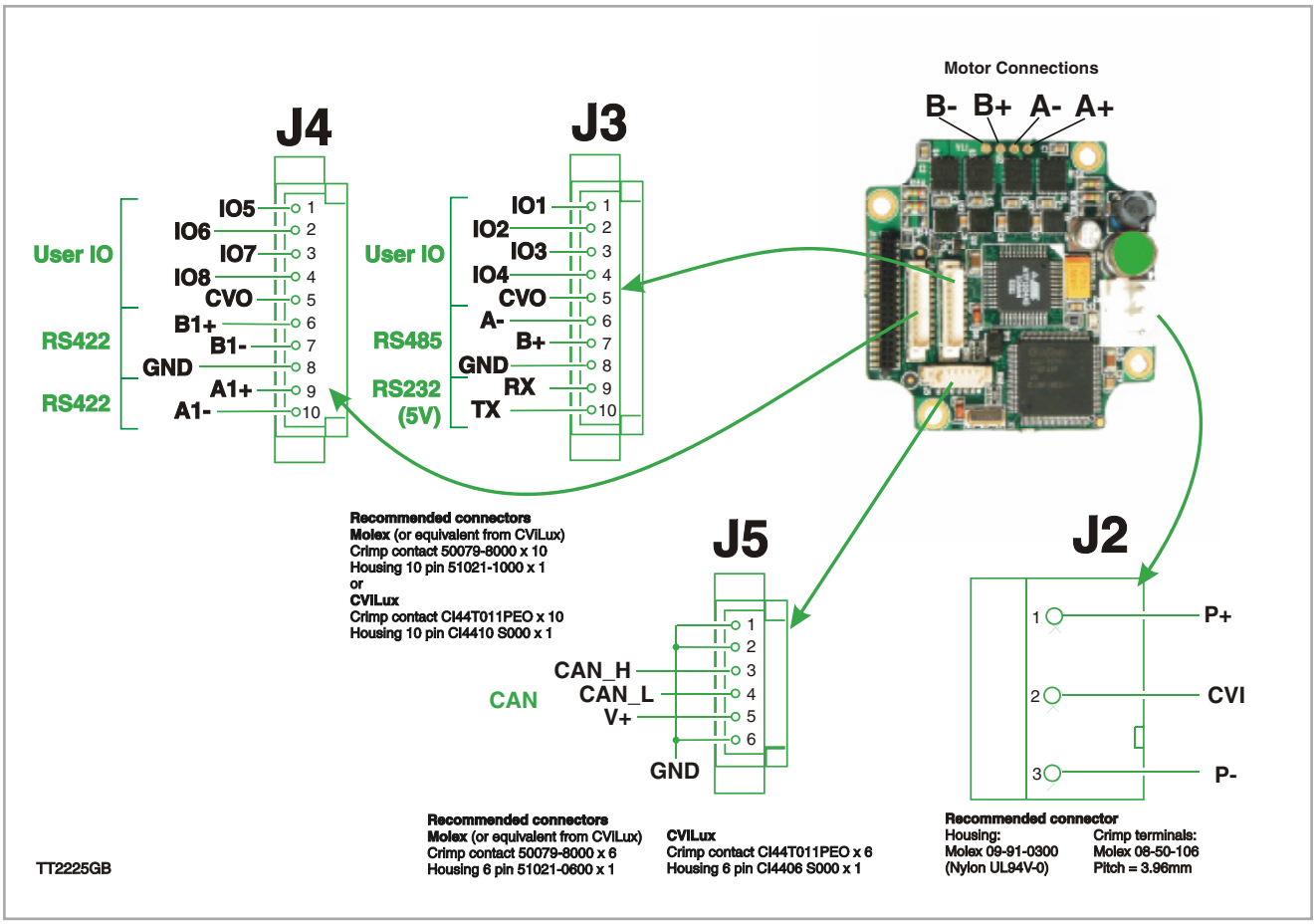




5-pole connector	
Pin no.	Color
1	Brown
2	White
3	Blue
4	Black
5	Grey

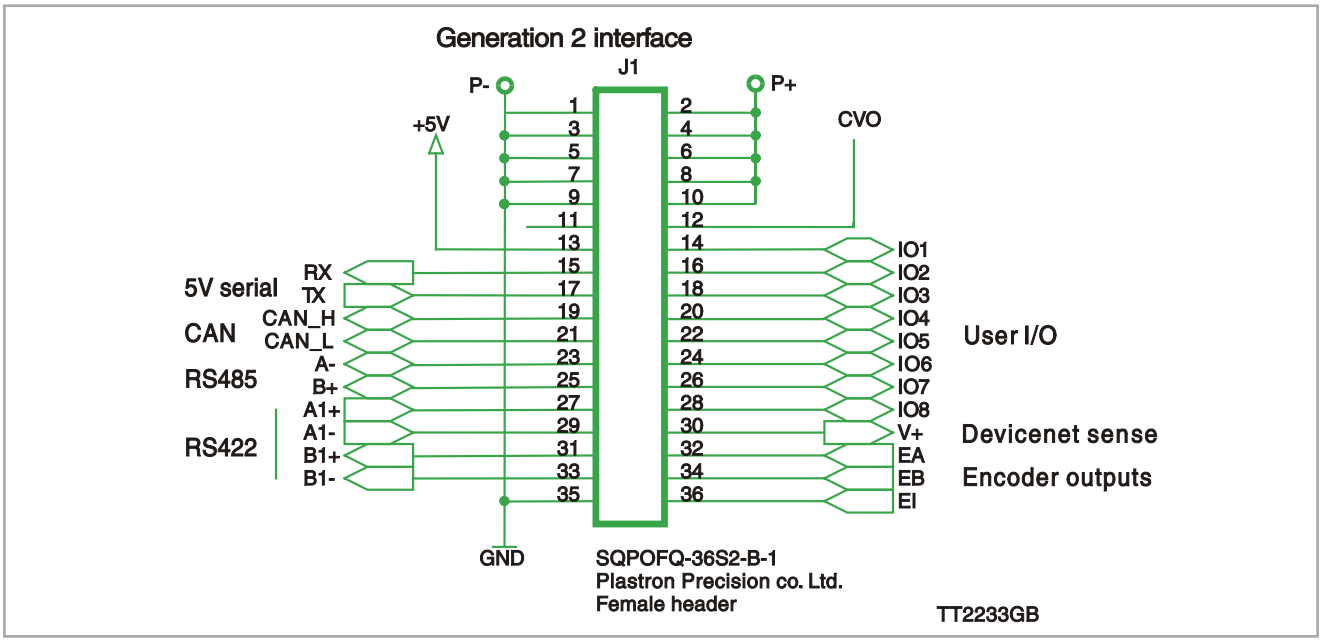
8-pole connector	
Pin no.	Color
1	White
2	Brown
3	Green
4	Yellow
5	Grey
6	Pink
7	Blue
8	Red

Connections, PCB version



Above is shown the connections to the various connectors of the SMC75 PCB board.

Note that GND and P- are connected together internally.

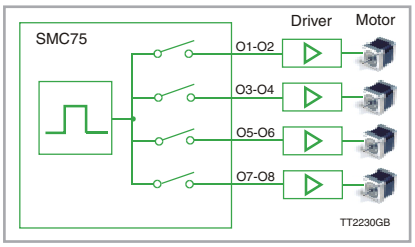


Above is shown generation 2 connector for future and special purposes.

Please contact JVL for further information

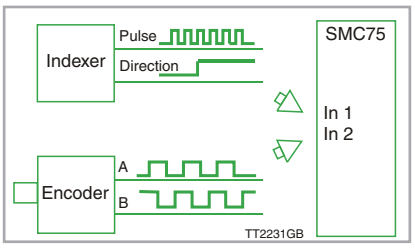
Special Functions

Pulse/direction to 4 drives



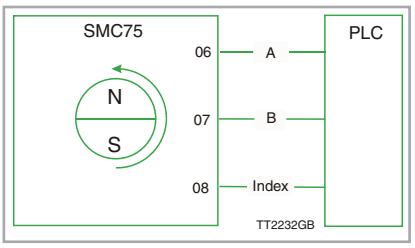
The 8 outputs can be used to generate pulse/direction for up to 4 drivers. This can be used for accurate syncronization of two or more motors, based on the same source signal.

Receive pulse/direction or incremental signal from external source



Pulse/direction or encoder can be connected. Thereby speed or position can be controlled proportional to the signal properties.
Electronic gearing is possible in the range 1/32767 to 32767.

Encoder counter output



If a magnet is mounted on the rear end of the motorshaft and this is placed in close distance to the SMC75 PCB, a 1024 pulses/rev. incremental A, B, index signal will be available on 3 of the output pins. Encoder position will also be available at an internal register and can be used in a PLC program.

Accessories SMC75xxWxx models

WG0905	Power cable 5m 3x0.75 shield 3.91 Ø6mm
WG0910	Power cable 10m 3x0.75 shield 3.91 Ø6mm
WG1005	IO and CANopen cable 5m 16xAWG28' shield Ø6mm
WG1010	IO and CANopen cable 10m 16xAWG28' shield Ø6mm

Recommended motors

JVL offers a wide range of high quality, high torque stepper motors, suitable for use with the Stepper Motor Controller SMC75.

Below are shown the most commonly used stepper motors from the JVL range of motors. Motors from other suppliers can also be delivered. For further information ask for technical datasheets.

Stepper Motors MST170, 171, 172, 173 and 174.
0.07 to 0.46Nm

Stepper Motors MST 230, 231, 232 and 233.
0.48 to 2.1 Nm

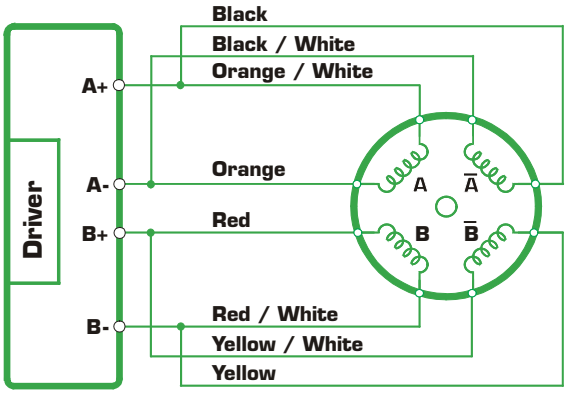
Stepper Motors MST340, 341 and 342.
3.0 to 7.2 Nm

Features

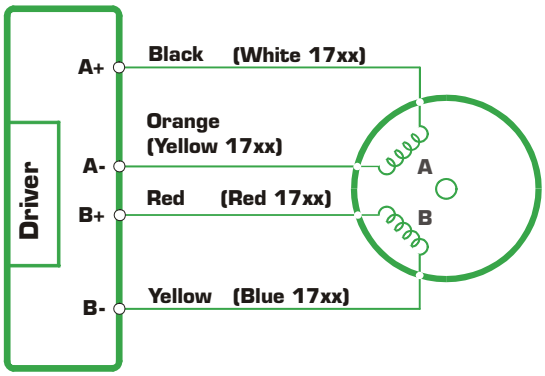
- Highest torque density rating in the industry
- High torque-to-inertia for faster start and stop
- Rugged design and long life bearings
- High power, cooler running, rare-earth magnet design
- Exposed-lamination housing, optimized for high torque and smooth, accurate microstepping
- Standard NEMA23 mounting
- Facilities for encoders, double shaft, different shaft types, etc.
- High axial and radial shaft load
- Cost-effective alternative to servo motors
- Low Noise
- Option for planetary gearhead

Connections to motors

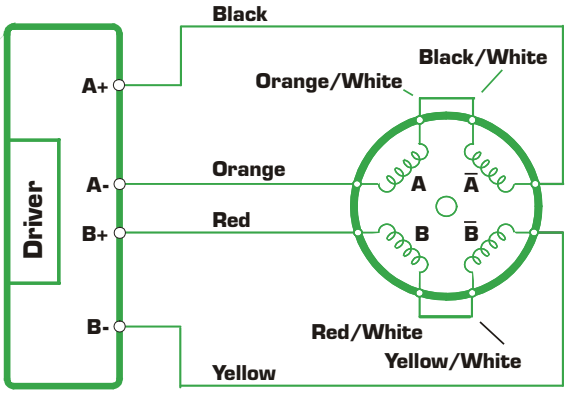
Connection of JVL and MAE motors (parallel). Type MST23x/ MST34x and HY200-xxxx-xxx-x8



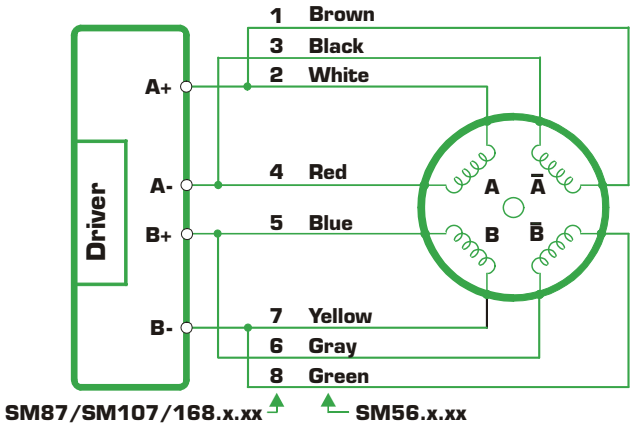
Connection of JVL and MAE 4 wire motors. Type MST17x and HY200-xxxx-xxx-x4



Connection of JVL and MAE motors (serial). Type MST23x/ MST34x and HY200-xxxx-xxx-x8

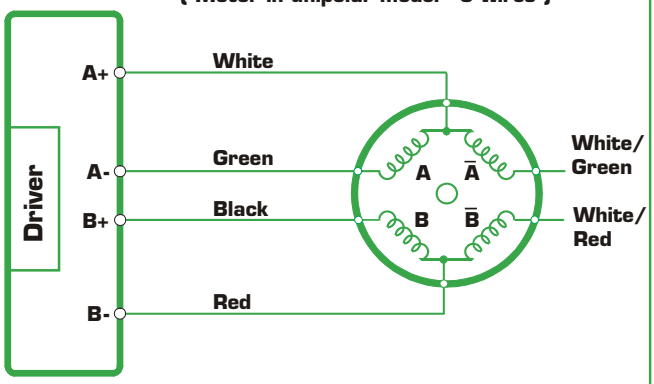


Connection of Zebotronics motor Type : SMxxx.x.xx.x (8 terminals)

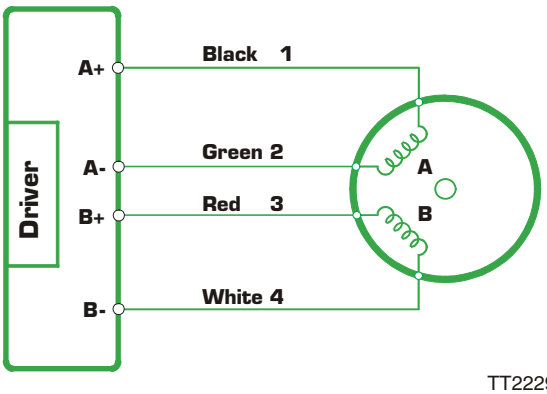


Connection of MAE motor (unipol.) Type HY200-1xxx-xxxxx6

(Motor in unipolar model - 6 wires)



Connection of Zebotronics motor Type : SMxxx.x.xx.x (4 terminals)



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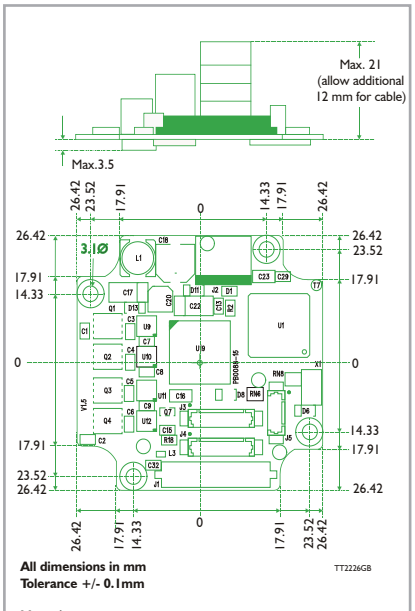
Ordering Information

SMC75 selection chart						
SMC	Stepmotor controller					
	75	Version 12-48VDC with 8IOA and optional CANopen/DeviceNet and encoder				
	85	Version 12-160VDC with 8IOA and optional CANopen/DeviceNet and encoder				
		A	PCB 3ARMS (default)			
		B	PCB 6ARMS			
		C	PCB 9ARMS			
			1	Hardware version 1. (default)		
			2	Hardware version 2		
				All M1 to M7 and Wx are housing versions with 1 additional m12 5 pin male connector for the motor output (mounted on the side of the box)		
				M1	M12 3 pcs. 5pin male (power), 8 pin female (RS485, IOA 1-4), 5 pin female (RS485).	
				M2	M12 2 pcs. 5 pin male (power). 8 pin female (RS485, IOA 1-4).	
				M3	M12 3 pcs. 5 pin male (power), 8 pin female (RS485, IOA 1-4), 5 pin female (RS485)	
				M4	M12 3 pcs. 5 pin male (power), 8 pin female (RS485, IOA 1-4), 8 pin female (5V serial, IOA5-8)	
				M5	M12 4 pcs. 5 pin male (power), 8 pin female (RS485, IOA 1-4), 5 pin female (RS485), 8 pin female (5V serial, IOA 5-8).	
				M6	M12 4 pcs. CANopen. 5 pin male (power), 8 pin female (RS485, IOA 1-4), 8 pin female (5V seriel, IOA 5-8), 5 pin male (CAN)	
				M7	M12 4 pcs. DeviceNet. 5 pin male (power), 8 pin female (RS485, IOA 1-4), 8 pin female (5V serial, IOA 5-8), 5 pin male (Device)	
				WA	2 pcs. PG12 cable Glands M12x1.5 and no cable mounted (Rear end mounted) No fieldbus (Default)	
				WC	2 pcs. PG12 cable Glands M12x1.5 and no cable mounted (Rear end mounted) Fieldbus CANopen	
				WD	2 pcs. PG12 cable Glands M12x1.5 and no cable mounted (Rear end mounted) Fieldbus DeviceNet	
				AA	No fieldbus (Default) Only PCB	
				AC	Fieldbus CANopen. Only PCB	
				AD	Fieldbus DeviceNet. Only PCB	
					H1	Magnetic encoder chip1
					H2	Magnetic encoder chip 2 mounted. 256x4=1024 counts (AS5040)
						-05 cable lenght in m. Only Wx models. Mounted with 1pc. WG0905 and 1 pc. WG1005
SMC	75	A	1	M4	H2	

Examples	
SMC 75 A 1	Steppermotor controller only PCB. No housing and encoder chip
SMC 75 A 1 AC	Steppermotor controller only PCB, CANopen. No housing and encoder chip
SMC 75 A 1 AA H2	Stepper motor controller only PCB with magnetic encoder chip type H2 mounted. No housing
SMC 75 A 1 AC H2	Stepper motor controller only PCB with Fieldbus CANopen and magnetic encoder chip type H2 mounted. No housing
SMC 75 A 1 M7	Stepper motor controller in a box with connector M7 and Devicenet.
SMC 75 A 1 M6 H2	Stepper motor controller in a box with connector M6 and Canopen and H2 magnetic encoder.

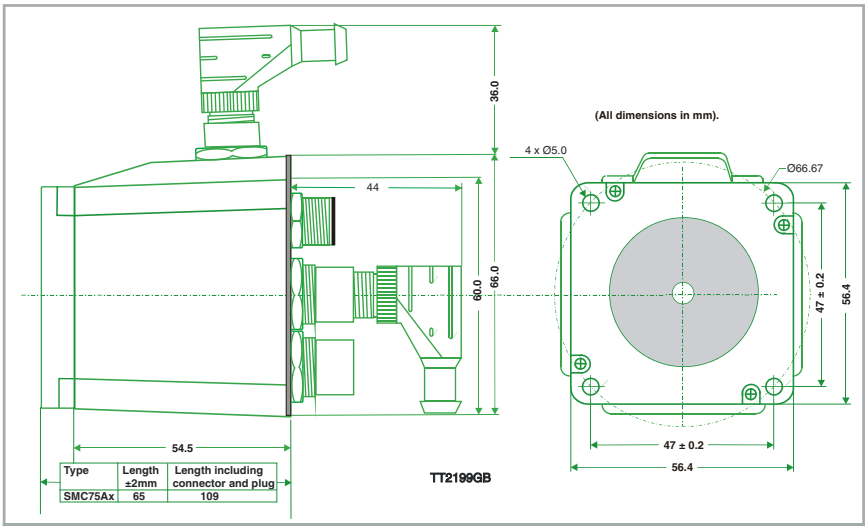
SMC75 PCB Board



All dimensions in mm
Tolerance +/- 0.1mm

Mounting:
Use standard M3 screws with Ø6 mm heads to avoid collision with components on the PCB. Note that there are components on both sides of the PCB. Use min. 4 mm spacer.

Dimensions, SMC75 in Housing



Type	Length ±2mm	Length including connector and plug
SMC75Ax	65	109

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